

# ANALYSIS OF ECONOMIC INSTRUMENTS RELATED TO ECONOMIC RESILIENCE

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**Abstract.** *Resilience is a concept taken from various research fields such as psychology, ecology and engineering and transferred to security studies. At the epistemological level, we need to establish the utility of such a concept, as well as its identity, and its concrete added value for security studies, as it overlaps with a number of other concepts such as security, vulnerability, good governance, sustainability. The main objective of this paper is to analyze conceptual approaches to economic resilience in the context of sustainable development. The scientific tools applied to achieve the outlined objectives involve traditional systemic and advanced scientific research methods: the documentary method including for the formation of databases, the synthesis method applied to establish the connections between the researched phenomena; the systemic analysis method, through which the main components of economic resilience will be researched; the method of quantitative and qualitative analysis, applied to the analysis and interpretation of economic resilience indicators through the prism of macroeconomic indicators. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

**Keywords:** *economic resilience, economic growth, instruments, security, crisis.*

**JEL:** O20, O30

**UDC:** 338

**Introduction.** The evaluation of the economic resilience of a country is increasingly important in the current context of the Republic of Moldova, in view of the difficult regional situation caused by the war between Ukraine and Russia. Therefore, the Republic of Moldova is a vulnerable state with a strategic geopolitical situation that has limited material resources. The regional context of the country is quite difficult and the situation becomes even more difficult if the frozen conflict in the Transnistrian region is taken into consideration. In this context, the Republic of Moldova needs more resilient economic policies and socio-demographic reforms that would stimulate national completeness both internally and externally. Thus, the resilience of the business environment plays a crucial role for the development of the national economy, the driving force being entrepreneurs and private sector

employees. This study proposes to identify the main resilient economic indicators through a theoretical approach at the first stage, by applying a fundamental research based on theoretical and methodological considerations.

The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

**Literature review.** The research highlights the components that constitute those concrete differences in meaning, substance and content that recommend that resilience remains a concept in itself, in line with epistemological requirements (Shea 2016). The identity dilemma has many sides and angles of approach to the subject, but we preferred to rely on the original sources of the concept, as well as the definition that gave the concept practical relevance (Chandra et al. 2011, 7-10). This is the first methodological point on which we lean, that of the identity of the concept. The sources for saving the concept come from the sphere of societal security (Chifu, Nantoi and Sushko 2008) and intangibles (Chifu 2023b, 13-21) as is the case for their practical added value, because these elements explain why measurable data and quantitative models do not are sufficient to cover the relevance of a country in times of war. It is true, however, that we must recover, at the same time, the components that explain resilience critical infrastructures (European Commission 2023), as well as the resilience of systems (Boon and others 2012) that act to provide constant and uninterrupted specific services to the population. Crisis management (including civil emergencies) and the content of crisis decision-making (Chifu 2019, 335; Chifu and Ramberg 2007, 387; Chifu and Ramberg 2008, 352) is also part of the specificity and added value of resilience to be recovered and included in the substance and content of the concept. The second part of our study also analyzes the components of institutional resilience (Aligica and Tarko 2014, 52-76) and errors in the application of the concept, as we analyze the many models of creating indicators and providing a measurable model of resilience institutional. The demarcation made within the concept of institutional resilience between resilience in itself and resilience as a purpose and utility (Gupta et al. 2010, 459-471), to support the continuity of services to a community or society, is essential because the opposite is ready to create monsters and to give a role to authoritarian solutions. This is the second methodological approach. Democratic resilience (Chifu 2018, 23-30) seen as a condition, limitation and moral relevance is also a necessity in describing institutional resilience as well as resilience itself in a democratic country. But here we also have epistemological solutions that could prove the component of democratic resilience as a long-term necessity, because authoritarian regimes are doomed to create imbalances, discontent and mistrust and open the door to direct instability by challenging the rules of the system that disregard individual freedom and choice free of society. And, this is the third angle of methodological approach, if not the condition, for a full debate on resilience in democratic societies.

Resilience is fundamentally related to a human community/society and community resilience as an emergent property of dynamic socioecological systems through which communities can respond positively to a range of risks, including shocks, extreme events and other changes. There are five different capabilities and the assessment of how the interactions between them confer resilience: attachment to place, leadership, community cohesion and efficacy, community networks, and knowledge and learning. Its relevance is related to conservation, disaster risk reduction, climate change adaptation and community development (Folke et al. 2005, 441-473).

**Research methods.** The research is of a theorized type, as it focuses on the evolution of the notion of resilience, as well as on the starting points that facilitated the placing of emphasis on the economic field and was structured as follows: the analysis of the state of knowledge relevant to the research problem, the trends and the establishment of solutions. The purpose of this article is to highlight the currently available research on economic resilience and to identify the contextual trends that mediate and moderate this relationship across national economic conditions. Also, during the research, the following were applied: the interpretation of the results described in the specialized literature, the theory of depleted resources, systems analysis, comparative analysis. The established factors were analyzed from a legislative, financial and social perspective.

The scientific tools applied to achieve the outlined objectives require traditional systemic and advanced scientific research methods: the documentary method including for the formation of databases, the synthesis method applied to establish the connections between the researched phenomena; the systemic analysis method, through which the main components of economic resilience will be researched; the method of quantitative and qualitative analysis, applied to the analysis and interpretation of economic resilience indicators through the prism of macroeconomic indicators.

**Results and discussion.** Economic resilience tools are mechanisms and strategies used by governments, companies and other economic entities to withstand and adapt to economic shocks and crises, thereby ensuring long-term stability and sustainability.

Economic resilience is the ability of an economy to withstand and adapt to external or internal shocks, such as economic crises, recessions, natural disasters, pandemics, or climate change, maintaining its long-term stability and recovery capacity. In a resilient economy, both government, companies and individuals are better prepared to deal with such disruptions, reduce the negative impact on the economy and recover quickly from a crisis.

Economic resilience is vital to sustainable development and key elements that contribute to a resilient economy include:

1. Financial Stability - A financially stable economy has sound banking and financial institutions with clear regulations and adequate reserves that reduce the risks of collapse in the face of economic shocks.

2. Economic diversification - Through a wide range of sectors and industries developed, the economy becomes less dependent on a single vulnerable sector and thus less exposed to risks.

3. Social security - Social assistance and support programs for vulnerable people help the population cope with loss of income and instability in times of crisis.

4. Investments in infrastructure and technology - A modernized infrastructure and a high level of digitization and innovation allow the economy to respond quickly and efficiently to challenges.

5. Flexible economic policies - Resilient governments apply counter-cyclical policies, i.e. stimulus measures in times of crisis and consolidation in times of growth, to avoid sharp fluctuations.

6. Strategic Reserves and Reserve Funds - By building up reserves of capital, energy resources or food, an economy can ensure that it has the necessary resources to handle periods of instability.

7. Educating and retraining the workforce - Preparing employees to adapt to new working conditions and technologies allows them to respond to changing market demands while maintaining economic competitiveness.

8. International cooperation - Economic, trade and security alliances allow countries to support each other in the face of global crises by providing access to foreign resources and markets.

A resilient economy not only protects against risks, but also creates a solid foundation for sustainable economic growth, innovation and long-term development. Thus, economic resilience becomes a central objective of modern economic policies.

Measuring the economic resilience of EU regions and member states to economic and financial crises, forecasts can be made with the help of composite indicators that aggregate four other composite or individual sub-indicators:

- Macroeconomics resilience sub-indicator calculated on the basis of three indicators: GDP/capita, Gross fixed capital formation/capita, Real gross added value in Construction/capita;
- The sub-indicator of economic resilience of firms (Economics firms resilience) calculated on the basis of a single indicator: Survival rate of firms;
- The labor market resilience sub-indicator calculated on the basis of a single indicator: real GDP/capita/number of working hours;
- The financial-banking resilience sub-indicator (Economics financial banking resilience) calculated on the basis of two indicators: Bank Z-score (probability of non-payment of the commercial banking system in a country - scaled inversely after normalization) and the Ratio between the credit granted by state-owned banks and state-owned enterprises and GDP - inversely scaled after normalization.

According to the above-mentioned indicators, the periods corresponding to the two dimensions that are generally considered in the analysis of resilience are

established, namely the resistance period and recovery periods (Sensier et al., 2016; Martin et al., 2016):

a) Resistance (Impact of the crisis) - is the period between the maximum value preceding the shock (peak) and the minimum value reached during the period corresponding to the shock (trough). It should be noted that the minimum value can also be reached after short recovery periods.

b) Recovery (Bounce back) - corresponds to the period between the minimum value reached during the shock period (trough) and the year in which the indicator value indicates a complete recovery (reached or exceeded the pre-shock value). If the indicator indicates a full recovery and exceeds the value corresponding to the pre-shock period, the limit of the interval becomes the first year in which this happens. If the indicator is still lower than its pre-shock value, the latest available data was used.

Indicators that measure resilience are part of the resilience-building process, generally being assessment, information and monitoring tools. As assessment tools, they help identify risks and vulnerabilities. As information tools, they contribute to the better design of early warning systems, emergency response plans, plans for the use of available or involved assets and resources, as well as raising awareness and communication about vulnerability and risks. As monitoring tools, they can identify how well a state, an economic sector, an infrastructure has responded to and recovered from disasters and incidents, and whether objectives have been met.

Therefore, economic resilience can be analyzed with the help of several indicators, among which:

- ✓ Gross Domestic Product (GDP) growth rate (higher GDP growth rates may indicate a more resilient economy, able to withstand shocks and recover more quickly).
- ✓ Employment rate (a higher employment rate may suggest a more resilient economy with more employment opportunities and labor market stability).

Several types of both general indicators (density, penetration, concentration) and indicators for determining the financial and managerial situation are used to assess the situation on a financial market. Next, the authors present the synthesized version of the indicators recommended for the screening of the banking sector in the Republic of Moldova. This set of indicators is used to monitor and analyze essential aspects of the activity of commercial banks, with the aim of ensuring their financial stability and resistance to external and internal shocks.

**Table 1. Economic resilience measurement indicators for the banking sector**

| Indicator                        |                                                                      | Indicator description                                                                                                                                                                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  | Internal credit provided by the banking sector in relation to GDP, % | If this indicator exceeds GDP growth by 2 times, then it can be considered a warning signal of the banking system crisis.                                                                                                                                                                                    |
| <b>Capital adequacy</b>          |                                                                      |                                                                                                                                                                                                                                                                                                              |
|                                  | Capital adequacy ratio ( $R_a$ ):                                    | $R_a = \frac{K}{A_p} \times 100\%$ <p><b>K</b> - total regulated capital<br/> <b>A<sub>p</sub></b> – risk-weighted assets</p>                                                                                                                                                                                |
|                                  | Capital quality ( $C_k$ ):                                           | $C_k = \frac{K_I}{A_p} \times 100\%$ <p><b>K<sub>I</sub></b> – regulated capital of the first degree<br/> <b>A<sub>p</sub></b> – risk-weighted assets</p>                                                                                                                                                    |
|                                  | The ratio of non-performing loans to capital ( $R_{rc}$ ):           | $R_{rc} = \frac{P_n}{K} \times 100\%$ <p><b>P<sub>n</sub></b> – non-performing loans<br/> <b>K</b> – total regulated capital</p>                                                                                                                                                                             |
| <b>Asset quality</b>             |                                                                      |                                                                                                                                                                                                                                                                                                              |
|                                  | The rate of non-performing loans ( $R_{cn}$ ):                       | $R_{cn} = \frac{C_n}{P_c} \times 100\%$ <p><b>C<sub>n</sub></b> – non-performing loans<br/> <b>P<sub>c</sub></b> – loan portfolio      <math>1\% \leq R_{cn} \leq 3\%</math></p>                                                                                                                             |
|                                  | Sectoral concentration of credits ( $C_s$ ):                         | $C_s = \frac{C_i}{P_c} \times 100\%$ <p><b>C<sub>i</sub></b> – credits granted to sector i<br/> <b>P<sub>c</sub></b> – loan portfolio</p> <p><b>C<sub>i</sub> = 1/3 P<sub>c</sub> (for the classification of loans in three categories: consumer, commercial, granted to the manufacturing industry)</b></p> |
|                                  | Credit coverage ratio ( $C_a$ )                                      | $C_a = \frac{R}{P_c} \times 100\%$ <p><b>R</b> – allowances for credit losses<br/> <b>P<sub>c</sub></b> – loan portfolio.<br/> <b>C<sub>a</sub> ≥ 1,5%</b></p>                                                                                                                                               |
| <b>Revenue and profitability</b> |                                                                      |                                                                                                                                                                                                                                                                                                              |
|                                  | Return on assets (ROA):                                              | $ROA = \frac{P_n}{A_t} \times 100\%$ <p><b>P<sub>n</sub></b> – Net income<br/> <b>A<sub>t</sub></b> – average assets<br/> <b>ROA ≥ 1%</b></p>                                                                                                                                                                |
|                                  | Return on capital (ROE):                                             | $ROE = \frac{P_n}{K_p} \times 100\%$ <p><b>P<sub>n</sub></b> – Net income<br/> <b>K<sub>p</sub></b> – average share capital      <b>ROE ≥ 10% – 15%</b></p>                                                                                                                                                  |

|                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capital multiplier (EM):                                                                | $EM = \frac{A_t}{K_a}$ <p><b>A<sub>t</sub> – total assets</b><br/> <b>K<sub>a</sub> – share capital</b>      <b>EM &gt;15 point</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Net interest margin (NIM):                                                              | $M_n = \frac{V_n}{A_p} * 100\%$ <p><b>V<sub>n</sub> – net interest income</b><br/> <b>A<sub>p</sub> – average interest-generating assets</b>      <b>NIM ≥ 3%</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Exposure to currency exchange risk</b>                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Currency position rate (R <sub>PV</sub> ):                                              | $R_{PV} = \frac{A_s - P_s}{K} \times 100\%$ <p><b>A<sub>s</sub> – assets in foreign currency</b><br/> <b>P<sub>s</sub> – liabilities in foreign currency</b><br/> <b>K – total regulatory capital.</b><br/> <b>a) Long open R<sub>pv</sub> in each foreign currency &lt; "+10%";</b><br/> <b>b) Short open R<sub>pv</sub> in each foreign currency &gt; "-10%";</b><br/> <b>c) the amount of long open R<sub>pv</sub> in all foreign currencies &lt; "+20%";</b><br/> <b>d) the amount of short open R<sub>pv</sub> in all foreign currencies &gt; "-20%".</b><br/> <b>The ratio between the sum of balance sheet foreign currency assets and the sum of balance sheet currency liabilities &lt; "+25%" or be less than "-25%".</b></p> |
| Average bank interest rate on loans in national currency                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| The level of change in the real interest rate r for both credit resources and deposits. | <b>threshold value:</b> $\left  \frac{\Delta r}{r} \right  \geq 50\%$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Concentration indicators</b>                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CR-4, %                                                                                 | <b>Market concentration coefficient (CR-4) %, values:</b><br><b>Poorly concentrated market: CR-4 &lt; 35%;</b><br><b>Moderately concentrated market: 35% &lt; CR-4 &lt; 70%;</b><br><b>Excessively concentrated market: 70% &lt; CR-4 &lt; 100%.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| HHI, point                                                                              | <b>Herfindahl-Hirschman coefficient (HHI) points, values:</b><br><b>Poorly concentrated market: HHI &lt; 800.</b><br><b>Moderately concentrated market: 800 &lt; HHI &lt; 1800.</b><br><b>Overly concentrated market: 1800 &lt; HHI &lt; 10000.</b><br><b>HHI &gt; 1400 further verification is required.</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |

*Source: developed by the authors according to the data provided by the NBM.*

Non-bank lending activity in the Republic of Moldova is carried out through non-bank lending organizations and savings and loan associations. The authors present in table 2, the indicators for measuring the resilience of the non-banking sector.

Table 2. **Indicators measuring the resilience of the non-banking sector**

| Indicator description                                                                                                                                                                                                                                                     | Calculation method and values                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.A. Penetration rate, the difference between the number of loan beneficiaries and the active population, %                                                                                                                                                               | 1.A. = $\text{No. beneficiaries of impr.} / \text{active population} * 100\%$                                                                                                                                                                                                               |
| 2.A The mobility rate in the sector represents the evolution of the number of organizations in the sector, it provides information on the existing barriers to entry and the level of competitive pressure in the sector.                                                 | 2.A = $\text{No. of OMF 2016} - \text{No. OMF 2017} / \text{No. of OMF 2016}, \%$                                                                                                                                                                                                           |
| 3.A. Capital adequacy. The solvency ratio is a debt rating index that can be applied to any type of organization to assess how well it can cover both short-term and long-term financial risks.                                                                           | Leverage = $\text{Total assets} / \text{total capital}$ ;<br>Solvency = $\text{Total assets} / \text{Loans received}$ ;<br>General debt ratio (financial leverage) = $\text{Loans received} / \text{total capital}$ .                                                                       |
| 4.A. Return on assets - ROA is one of the main profitability indicators of an organization that measures the efficiency of the use of assets from the point of view of profit obtained and shows how many lei it brings in the form of profit per lei invested in assets. | 4.A. = $\text{Profit} / \text{Assets} * 100\%$                                                                                                                                                                                                                                              |
| 5.A. Return on capital – ROE reflects the efficiency of the use of shareholders' capital and is determined as the ratio between net profit obtained and equity.                                                                                                           | 5.A. = $\text{Net profit} / \text{Equity} * 100\%$                                                                                                                                                                                                                                          |
| 6.A. The structure of loans granted by directions of use:<br>Loans granted to legal entities<br>Loans granted to individuals<br>Total loans granted.                                                                                                                      | 6.A. = $\text{Total agricultural loans} / \text{loans} * 100\%$                                                                                                                                                                                                                             |
| <b>II. Impactul indicatorilor financiari asupra PIB-lui</b>                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                             |
| 2.B. Gradul de intermediere financiară arată mărimea sectorului în raport cu activitatea economica (trebuie să aibă o valoare cât mai mare).                                                                                                                              | 2.B. = $\text{Total assets} / \text{GDP} * 100\%$ ;<br>2.B. = $\text{Loans granted} / \text{GDP} * 100\%$ ;<br>2.B. = $\text{Equity} / \text{GDP} * 100\%$ ;<br>2.B. = $\text{Bank credits and loans received} / \text{GDP} * 100\%$ ;<br>2.B. = $\text{Net profit} / \text{GDP} * 100\%$ . |
| <b>III. Concentration indicators</b>                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                             |
| 3.C. The Herfindahl-Hirschman Index (HHI), points, measures the degree of market concentration.                                                                                                                                                                           | Values: Weakly concentrated market: $\text{HHI} < 800$ .<br>Moderately concentrated market: $800 < \text{HHI} < 1800$ .<br>Overly concentrated market: $1800 < \text{HHI} < 10000$ .<br>$\text{HHI} > 1400$ – further verification is required.                                             |
| 4.C. The market concentration ratio (CR-4), %, is the sum of the market shares of the largest k players in the market. It generally includes a small number of organizations to highlight the possible oligopoly nature of the                                            | Values: Poorly concentrated market: $\text{CR-4} < 35\%$ ;<br>Moderately concentrated market: $35\% < \text{CR-4} < 70\%$ ;<br>Overly concentrated market: $70\% <$                                                                                                                         |

|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| market (a small number of organizations control a significant part of the market).                                                            | CR-4 < 100%.                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>IV. The OMF connection with the online environment</b>                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.D. The KPI performance indicator is a performance evaluation tool that illustrates the degree of achievement of a desired parameter.</b> | <ul style="list-style-type: none"> <li>➤ No. of sessions/visits – how much traffic comes and from which sources;</li> <li>➤ impressions on the page;</li> <li>➤ average session duration per site/page – the average time spent on the site by a user – to see if it captured the attention/interest of visitors.</li> <li>➤ unique social actions – Twitter, Facebook, Google Plus and LinkedIn.</li> </ul> |

*Source: developed by the authors according to the data provided by the National Bank of Moldova and the CNPF.*

The indicators presented above are used by regulatory and financial supervisory authorities to monitor the health of the banking and non-banking sectors and to identify potential problems before they become critical. Implementation of these indicators helps maintain stability and confidence in the banking and non-banking sectors.

**Conclusions and recommendations.** Strategic resilience presupposes, mainly, the existence of a balanced, articulated and flexible economic-social system, in which daily processes and activities take place without major syncope, in order to achieve national development objectives and ensure individual contribution to cooperation and collaboration systems in which a state, in the present case Romania, is a part of. In addition to the domestic benefits, related to a high standard of living, avoiding the major effects of some crises and ensuring the prosperity of citizens, a strong state, which respects the principles and rules unanimously recognized, human rights, the rule of law, the rule of law, a consolidated market economy and a high level of security, is always seen as a serious, desired and respected ally.

Achieving such a level presupposes, first of all, a very good organization and effectiveness in action at the national level, a solid educational system that ensures the necessary, qualified and educated workforce, as well as the rational and appropriate allocation of resources for development, in the basis of long-term development strategies. As previously mentioned it is important to take into account initiatives before and after adverse events, namely stable and responsive initiatives. Stable initiatives refer to long-term efforts aimed at increasing the capacity of the community or region to withstand or avoid a shock. Responsive initiatives refer to the ability to respond to recovery needs following an adverse event.

In fact, the resilience indicators for the financial sector and other sectors are extremely important for the Republic of Moldova, in the perspective of developments that will take place in the future, in order to be able to generate ideas that contribute to the development of development strategies and plans for the economy of Moldova.

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